02/08/76 Mercer Airlines, Inc.

Official Accident Report Index Page

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Report Title	Mercer Airlines, Inc., Douglas DC-6/YC-112A, N901MA, Near Van Nuys Airport, Van Nuys, California, February 8, 1976
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Abstract	At 1044 P.s.t. February 8, 1976, Mercer Airlines Flight 901 crashed while attempting an emergency landing on runway 34L at the Van Nuys Airport, Van Nuys, California. The No. 3 engine had separated from the aircraft during takeoff from runway 15 at the Hollywood-Burbank Airport, Burbank, California; the No. 2 engine failed while en route from Burbank to Van Nuys. The aircraft crashed on a golf course about 1 mile short of the threshold of runway 34L at Van Nuys. Of the six persons on board the aircraft, three flightcrew members were killed; two flight attendants and a nonrevenue company employee were injured slightly. One person on the ground was injured slightly. During a postaccident fire, ten firemen were burned; three, seriously. The aircraft was destroyed. The National Transportation Safety Board determines that the probable cause of this accident was the degraded performance of the sircraft after two engines failed. The dual failure was precipitated by the in-flight failure of the No. 1 blade of the No. 3 propeller assembly. The failure of the propeller blade resulted from a fatigue crack which originated in the leading edge under the deicer boot. The crack had not been detected during an improperly performed overhaul. As a result of its investigation of this accident, the Safety Board issued three recommendations to the Federal

Aviation Administration.

Facts of the Accident

Accident NTSB ID	76-17
Airline	Mercer Airlines, Inc.
Model aircraft	DC-6/YC-112A, N901MA
Year shipped	1946
Aircraft manufacturer	Douglas
Engine type	R1800
Engine manuafacturer	Pratt & Whitney
Date	02/08/76
Time	1044
Location	Near Van Nuys Airport, Van Nuys, CA
Country	USA
Fatalities	3
Injuries	3 slight plus 1 on ground slight; 10 firemen burned, 3 seriously
Fire during flight?	Y in engine
Fire on the ground?	Y
Probable cause	The degraded performance of the aircraft after two engines failed. The dual failure was precipitated by the in-flight failure of the No. 1 blade of the No. 3 propeller assembly. The failure of the propeller blade resulted from a fatigue crack which originated in the leading edge under the deicer boot. The crack had not been detected during an improperly performed overhaul.
Weather conditions	Rain
Total crew size	5
Cockpit crew size	3
Cabin crew size	2
Passengers	1
Report ID	NTISUB/B/104-76/017
Pages	41
Day or night?	Day
Flight number	901
Flight origin	Burbank, CA
Flight destination	Ontario, CA
Description	The No. 3 engine separated from the aircraft during takeoff; the No. 2 engine failed while en route. The aircraft crashed on a golf course 1 mile short of the Van Nuys runway.

SYNOPSIS

At 1044 P.s.t. February 8, 1976, Mercer Airlines Flight 901 crashed while attempting an emergency landing on runway 34L at the Van Nuys Airport, Van Nuys, California. The No. 3 engine had separated from the aircraft during takeoff from runway 15 at the Hollywood-Burbank Airport, Burbank, California; the No. 2 engine failed while en route from Burbank to Van Nuys. The aircraft crashed on a golf course about 1 mile short of the threshold of runway 34L at Van Nuys.

Of the six persons on board the aircraft, three flightcrew members were killed; two flight attendants and a nonrevenue company employee were injured slightly. One person on the ground was injured slightly. During a postaccident fire, ten firemen were burned; three, seriously. The aircraft was destroyed.

The National Transportation Safety Board determines that the probable cause of this accident was the degraded performance of the aircraft after two engines failed. The dual failure was precipitated by the in-flight failure of the No. 1 blade of the No. 3 propeller assembly. The failure of the propeller blade resulted from a fatigue crack which originated in the leading edge under the deicer boot. The crack had not been detected during an improperly performed overhaul.

1. INVESTIGATION

1.1 History of the Flight

On February 8, 1976, Mercer Airlines Flight 901, a Douglas DC-6/YC-112A, (N901MA), was being ferried from Burbank, California, to Ontario, California. There were three flightcrew members, two cabin crewmembers, and one nonrevenue company employee on board the aircraft.

The cockpit voice recorder (CVR) transcript indicated that while the aircraft was taxiing at the Hollywood-Burbank Airport, the crew discussed a problem with the fuel pressure and the boost pump on the No. 3 engine. The hydraulically operated windshield wipers had been turned on because of rain. Also, there was a comment recorded on CVR, "That one inverter sounds awful."

At 1035:00, 1 Flight 901 was cleared by the Hollywood-Burbank Tower to make a rolling takeoff on runway 15. During acceleration, the flight engineer stated, "Look at that warning light on No. 3." There was no verbal response-from any other crewmember. The aircraft was accelerated normally to V_1 and V_2, was rotated, and was lifted off without difficulty. Shortly after the captain called for gear and flaps up, a loud noise was heard and the flight engineer announced that they had lost the No. 3 engine. Ground witnesses saw a flash of fire, black smoke, flying objects from the No. 3 engine, and the No. 3 engine separate from the aircraft. The first officer informed the captain that the engine had separated. The aircraft continued to climb and began a right turn.

At 1036:09, the crew of Flight 901 advised the Hollywood-Burbank Tower that they were returning to the airport and were declaring an emergency. They then requested and received clearance for a landing on runway 07.

At 1036:21, the local controller advised the flight that there was "trash" across the intersection of runways 07/25 and 15/23. The crew requested that crash equipment stand by, and the tower again advised them of debris across the intersection. The crew then inquired as to whether they could land on runway 07 or divert to the Van Nuys Airport. The local controller advised that there would be no problem with landing on runway 07 but that they might strike some of the debris on the intersection. During this period the reading of the emergency checklist was heard in the background. The captain elected to continue the approach and engine power was reduced to METO. 2 Immediately after the power was reduced, the crew saw that the No. 2 propeller reverse light was illuminated. Though incomplete, the emergency checklist was discontinued at that time.

The captain called for gear down and full flaps. As the approach continued, the first officer called out the airspeeds and, after reporting 115 kn, he said, "You got it made."

Ground witnesses reported that, as the aircraft circled the Hollywood-Burbank Airport, only the nose gear was extended. As the aircraft approached runway 07 for the emergency landing, witnesses reported that the main gear was also extended. The witnesses did not see the position of the flaps.

The aircraft touched down near the end of runway 07; the captain called for flap retraction and "gate." 3 The engine sounds increased, and the first officer advised the captain that the propellers were not going into reverse and to use the brakes. As the engine sound decreased, the captain replied that nothing was happening. The first officer said, "Get your air--get your air." The captain replied, "I'm doing it!" Maximum power was then applied; the aircraft again took off, and cleared the blast fence at the end of the runway by approximately 30 feet. The captain called for gear and flaps up. The first officer advised that the flaps were up as he positioned the gear handle to "up." Ground witnesses saw the aircraft begin a slow, climbing turn to the right.

At 1039:35, the crew advised the Hollywood-Burbank Tower that they had no brakes and that they were proceeding to the Van Nuys Airport, 6 nmi to the west. The crew then saw that the No. 2 oil pressure was low and that there was no BMEP 4 indication. Attempts to feather the No. 2 propeller were not successful, and the No. 2 engine stopped with the propeller blades at a positive, low pitch angle.

Ground witnesses reported that as the aircraft was proceeding toward Van Nuys Airport, the main gear was extended. The crew requested the Hollywood-Burbank Tower to inform the Van Nuys Tower that the flight would need to land on runway 34 and to have the emergency equipment stand by. This request was relayed to Van Nuys by the Burbank coordinator over the land line between the two towers. The flight contacted the Van Nuys Tower and was cleared by the local controller to enter traffic on the east side of the airport for a landing on runway 16, which was the active runway. The crew again requested runway 34 with the added information, "... that's about all we're going to make."

At 1043:22, the Van Nuys local controller cleared the flight to land on runway 34L, and the crew reported they had no brakes. As the aircraft approached the airport from the southeast, it was losing altitude and airspeed. The crew realized that they could not reach the airport and the captain commented that the windshield wipers were inoperative. The flight engineer explained that the windshield wipers did not work because the hydraulic system was inoperative. The throttles were retarded and a forced landing was attempted on the Woodley Municipal Golf Course, about 1-mile south of the Van Nuys Airport.

The aircraft touched down on it's main landing gear and bounced three times. The nose of the aircraft struck a 24-inch-high concrete foundation of a partially constructed building. The aircraft came to rest against a house trailer parked nearby. A fire erupted about 20 minutes after the crash while firemen were engaged in rescue activities.

The accident occurred during daylight hours at 1044:25 on February 8, 1976. The geographic coordinates of the accident site are 34°11' N latitude and 118°29' W longitude.

1.2 Injuries to Persons

Injuries	Crew	Passengers	Others
Fatal	3	0	0
Nonfatal	2	1	11
None	0	0	

1.3 Damage to Aircraft

The aircraft was destroyed.

1.4 Other Damage

A partially constructed building and a house trailer at the golf course were destroyed. Fairways, greens, a tee, and a power line were damaged.

1.5 Crew Information

The crew of Flight 901 was certificated and trained in accordance with current FAA regulations. (See Appendix B.)

1.6 Aircraft Information

1.6.1 Aircraft

The aircraft was certificated in accordance with existing regulations. All maintenance checks and airworthiness directives had been performed as required. The most recent heavy maintenance check was accomplished by Mercer Airlines on December 13, 1975; total aircraft time was 10,226 hours. Total time of the aircraft at the time of the accident was 10,280.4 hours. (See Appendix C.)

At takeoff, the aircraft's gross weight was 64,579 lbs., including 9,600 lbs. of 100/130 octane aviation fuel. The center of gravity (c.g.) forward limit (landing gear extended) was 14 percent MAC, and the rear forward limit (landing gear extended) was 35 percent MAC. The weight and c.g. for the flight were within prescribed limits.

1.6.2 Propellers

The propellers installed on N901MA were Curtiss-Wright electric propellers, Type C632-S. Propeller No. 3, serial No. 153465, had been overhauled in September 1975, and had been installed on N901MA in November 1975; it had accumulated 85 hours since installation.

The documents from the propeller overhaul facility indicated that the No. 3 propeller had been inspected magnetically (Magnaflux), but the specific parts inspected were not listed. Interviews with the overhaul facility's management personnel and the magnetic inspection facility's personnel established that the blades had been magnetically inspected, but that the rubber deicing boots, which cover about 45 inches of the inboard portion of the 75-inch blades' leading edge, had not been removed from the blades during the inspection. Personnel from both facilities stated that the rubber boots usually were not removed from the blades if the heating elements checked out electrically and if the rubber material had not been damaged or frayed.

Publication 5-3B3-550, dated March 1, 1962, is Curtiss-Wright's most recent overhaul manual for C332-S propellers. Part 3B3 of the manual pertains to the overhaul of the blades in general. Chapter 63.2, dated September 1, 1957, together with Model Difference Sheet 63.2-4MDS, dated November 1, 1964, describe the method to be used when magnetically inspecting the steel blades on the propeller. The instruction required that all steel blades be inspected over the entire external surface. The propeller overhaul facility did not have a copy of Chapter 63.2 or 63.2-4MDS in its library.

Mercer Airlines had the most recent propeller manual in its library; however, they had not determined which manuals or procedures were being used by the overhaul facility.

14 CFR 121.367 and 14 CFR 145.2 specify that the certificate holder (operator) shall have a program to insure that all maintenance, preventive maintenance, and alterations are performed in accordance with his (the operator's) manual.

14 CFR 121.363 places the responsibility for the airworthiness of an aircraft and its components on the certificate holder. It provides for the certificate holder to make arrangements with others to perform the required maintenance operations; however, it specifies that these arrangements do not relieve the certificate holder of the responsibility for assuring that the aircraft is airworthy.

The overhaul facility was under the surveillance of the maintanance inspectors of the Federal Aviation Administration's (FAA) Santa Monica General Aviation District Office. The Safety Board found no evidence that the FAA had noted or had informed the management of the overhaul facility that the overhaul facility did not possess the most current overhaul manual.

1.7 Meteorological Information

Meteorological observations at both the Hollywood-Burbank and Van Nuys Airports are made by FAA control tower personnel who have been certificated by the National Weather Service.

At 1002, the Burbank weather observation for February 8, 1976, was: "1,000 feet scattered, estimated 7,000 feet overcast, visibility--4 miles, light rain and fog, temperature--56°F, wind--°at 4 kn. altimeter setting--29.97 in."

The Van Nuys weather observation was: "600 feet scattered, 1,000 feet scattered, estimated 8,000 feet overcast, visibility--10 miles, light rainshowers, temperature--55°F."

At 1045, an observation for Van Nuys was: "Special, 1,200 feet scattered, 10,000 feet overcast, visibility--10 miles, rainshowers, wind--130° at 4 kn, altimeter setting--29.93 in."

The accident occurred during daylight hours, under overcast skies, and in rainshowers.

1.8 Aids to Navigation

Not applicable.

1.9 Communications

Air-to-ground communications and land-line communications between the Hollywood-Burbank Tower and the Van Nuys Tower were normal.

1.10 Aerodrome and Ground Facilities

Hollywood-Burbank Airport, elevation 775 feet m.s.l., has two runways -- 15/33 and 07/25. Runway 15/33 is 6,088 feet long and 150 feet wide, and has an asphalt surface. Runway 07/25 is 6,555 feet long and 150 feet wide and has an asphalt surface.

Van Nuys Airport, elevation 800 feet m.s.l., has two parallel runways -- 16/34. 16R/34L is 8,000 feet long and 150 feet wide and has an asphalt-concrete surface. 16L/34R is 4,000 feet long and 75 feet wide, and has an asphalt surface.

Instrument approach aids were available at both airports; however, they were not involved in this accident.

1.11 Flight Recorders

N901MA was not equipped with a flight data recorder, nor was it required. It was equipped with a United Data Control cockpit voice recorder, model 557Z, serial No. 1035. The recorder was not damaged by impact or ground fire. The tape was good quality and contained a record of the entire flight beginning with the pre-engine start checklists. (See Appendix D.)

1.12 Wreckage

1.12.1 Components Separated in Flight

The No. 3 engine, engine cowling, propeller, two pieces of lower fuselage skin, two pieces of the right (inboard) side cowling of the No. 2 engine, and the No. 2 propeller alternator separated from the aircraft during the initial takeoff from the Hollywood-Burbank Airport. Debris from the No. 3 engine was scattered across the intersection of runways 15/33 and 07/25.

The No. 1 blade of the No. 3 propeller was found on the runway. This blade had a chordwise fracture 43 inches from its tip. A 10-by 1.5-inch section was missing from the trailing edge of the blade. The remainder of the trailing edge was curled forward over the thrust face. A spanwise crease, about 24 inches long, extended outward from the fracture. There was a 9-inch cut through both faces of the blade and midway along the crease. At the leading edge, adjacent to the fracture, the blade was curled, torn, and kinked. Red paint, which covered the tip of the blade, was rubbed and scraped in a random pattern. Red paint was also found on the two pieces of the right (inboard) side cowling from the No. 2 engine which were recovered near the runway intersection.

These two pieces of cowling had been penetrated from the outside. Directly in line with this rupture in the cowling, the front accessory case of the engine had been penetrated and a large hole was punctured in the casing. Fragments of the case material were found inside the engine case. The No. 2 propeller electrical junction box was flattened and bent inward through the hole. The terminal blocks were broken and several of the terminals disconnected. The drive gears for the oil scavenge pump, which are located at the bottom of the accessory case, were disengaged.

1.12.2 Main Wreckage

The aircraft came to rest on a magnetic heading of 232°, about 50 feet from the western edge of the Woodley Municipal Golf Course and 1,200 feet south of Victory Boulevard in Van Nuys, California. The crash site is about 1-mile south of the threshold of runway 34L at the Van Nuys Airport. The elevation of the wreckage site was about 715 feet m.s.l.

The air aircraft had touched down on a magnetic heading of 278° and continued on that heading for about 1,710 feet until it struck the foundation of a partially constructed building. The aircraft rotated 46° to the left and slid about 140 feet; it came to rest against a house trailer.

A ground track, made by the outboard tire of the left main landing gear, began about 1,850 feet from the house trailer; the track was the first indication of ground contact. The main landing gear struts separated from the aircraft when it struck the concrete foundation. The wings, empennage, and fuselage, aft of fuselage station 261, remained essentially intact. The flaps were retracted.

The fuselage was torn or broken across the entire width of the aircraft at station 261. The forward portion of the fuselage was bent downward. The cockpit and forward portion of the passenger cabin were destroyed by impact.

The lower skin of the fuselage and the floor of the forward baggage compartment was torn and folded inward. The edges of the separation were jagged and the surfaces of the separation had deposits of a substance that appeared to be red paint.

Both horizontal stabilizers were streaked with oil; the left side of the fuselage was streaked with hydraulic fluid.

The left side fuselage tunnel, which is in the general area of the fuselage ice plate and below the cabin floor, had been punctured. The following lines are routed through this area: Nose gear actuation system, engine manifold pressure, emergency airbrake, and almost all of the cockpit electrical wiring. The hydraulic pressure for the wheel brakes and nose wheel steering are taken from the nose gear actuation line.

Many of the lines and much of the electrical wiring in the left side fuselage tunnel had been cut by the propeller blade. However, impact and fire damage prevented the identification of the lines and electrical wires that had been cut.

The emergency locator transmitter (ELT) was intact in its mounting and the antenna was connected. The ELT control switch was in the "Arm" position; however, the ELT did not activate. When tested by impact loads imposed from all directions, the unit did not activate; however, when tested in the manufacturer's test rig, the unit activated.